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1940 FOREST INSECT SURVEY,

SIERRA NATIONAL FOREST

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by
J. E. Patterson
Berkeley, California
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Forest Insect Laboratory
Berkeley, California
November 7, 1940

1940 FOREST INSECT SURVEY,

SIERRA NATIONAL FOREST

APPROVED BY:

J. M. MILLER
Senior Entomologist, In Charge

SUBMITTED BY:

J. E. PATTERSON
Associate Entomologist

1940 FOREST INSECT SURVEY, SIERRA NATIONAL FOREST

INTRODUCTION

The 1940 Forest Insect Survey of the Sierra National Forest was made by the Forest Insect Laboratory, Berkeley, California. The survey was carried out September 16 to 28, 1940. Those responsible for the field work included J. M. Miller, G. R. Struble, Noel Street, E. C. List, and J. E. Patterson. Miller Struble and Street surveyed the Bass Lake Unit. The sample plots and road strips were surveyed by Struble, Street and List, while the general reconnaissances were carried out by Struble and Patterson. Patterson is responsible for the interpretation of the field data and the general estimates. The entire cost of making the survey was borne by the Forest Insect Laboratory.

EXTENT AND METHOD OF SURVEY

The survey was extended to cover the principal pine forested areas that have been regularly included in the annual surveys carried out during the past ten years. A total of 140,000 acres of forested area was surveyed. The two methods, general reconnaissance, and full coverage of sample plots, were employed in this survey. The 5 permanent sample plots were intensively cruised and all insect killed trees on them were marked and recorded. The general reconnaissance covered all the infestation units previously set up on the forest as well as the contiguous areas. The reconnaissance was further amplified by road counts and road survey strips. The resulting data from plot surveys and reconnaissances form the basis for the loss estimates tabulated in the appendix, and for the appraisal of the current infestations.

GENERAL INFESTATION CONDITIONS

A pronounced general decrease in insect activity occurred in 1940 throughout the region surveyed. This decrease has been more marked in the lower elevation areas where the timber stands are largely composed of ponderosa pine. It is estimated that the 1940 loss on these areas is not more than 20 percent of that of the previous year. In the higher elevation pine stands the decrease has not been so great. In general the status of the 1940 infestation is approximately 70 percent less than the total of 1939.

The mountain pine beetle (Dendroctonus monticolae), and the western pine beetle (Dendroctonus brevicomis), continue to be the principal insects responsible for timber losses. However, the flathead beetles (Melanophila spp) are still active, particularly in the Jeffrey pine stands of the Chiquito Basin and locally at Bass Lake. Considerable top-killing has resulted from their activity at the latter place. A marked increase in dead terminals due to the small Scolytid (Phloeosinus sp.) has been observed on local areas, notably at Bass Lake, Shaver Lake and Fence Meadow. The injury caused by these beetles is not necessarily followed by attack on the lower trunk by other more lethal species.

In summing up the causes of the 1940 infestation it is apparent that the western pine beetle has caused the greater loss with the mountain pine beetle running a close second.

While in general the infestation is fairly uniform over the entire forest and of an intensity well below the normal for these stands, a local condition at variance with this status was found on the high ridge between Shaver Lake and Big Creek. Here the 1940 loss developed rather high proportions. It is of the type peculiar to high, exposed ridge sites and is local in its characteristics. About 8 sections, or 5,000 acres, are involved in this infestation. The infested area is located in the northwest quarter of Twp. 9S, R 25 E., and on the ridge dividing the Shaver Lake drainage and Big Creek canyon. The timber is a mixed stand of ponderosa pine, sugar pine and white fir. It is estimated that about 250 trees were killed during the active seasons of 1940. Of this number approximately 75 will harbor overwintering broods which will not emerge until the spring of 1941. Losses are due to the western pine beetle and the mountain pine beetle and are confined to ponderosa pine and sugar pine. While this infestation has not reached epidemic proportions, and also shows a definite tendency toward an early decline, the recreational values at stake are high. Due to these high recreational values on the infested area and on its immediate surroundings, control is justified although the infestation is not epidemic in character. It is recommended that control by direct methods be carried out during the coming winter season sufficiently comprehensive to protect this area against continued losses.

CONDITIONS ON UNIT AREAS

Measured losses on the permanent sample plots are summarized in Tables I and II. The infestation trend during the last three year period, 1938, 1939 and 1940, is indicated by a comparison of these annual losses on each plot. These data, together with those resulting from the strip surveys and extensive reconnaissances, provided the basis for the estimates of the 1940 losses shown in Table III.

Conditions on the individual infestation units are given separately for each unit.

Hugh Ryan Unit

Current infestation is the lowest recorded for the past 5 years. Infestations have followed the general trend of decreasing losses sustained in the lower, fringe type forests. Recent control work (1938-1939) has also contributed to the endemic character of the 1940 infestation. Direct control work carried out during the winter of 1939-40 resulted in the treatment of 83 infested trees. Their removal resulted in a decisive blow to the overwintering infestation. No immediate control work is suggested.

Bass Lake Unit

A decided decrease in infestation on this unit has occurred since 1939. This desirable condition is due in a large measure to the rigid control which has been maintained annually during the last five years in the immediate vicinity of the lake. The control work carried out during the 1940 season should result in further decrease. Maintenance control is desirable on this intensively used recreational area and is recommended.

A special report dealing with the characteristics of the beetle infestations in this unit is being prepared for early release by C. E. Struble.

Jackass Unit

The status of the present infestation is decidedly endemic. The 1940 losses aggregate less than 25 percent of that sustained in 1939. losses are about equally divided between ponderosa pine and Jeffrey pine. Minor losses have occurred in sugar pine. No immediate control work is warranted.

Placer Unit

Insect caused losses during 1940 have been decidedly endemic, registering a decline of over 50 percent since 1939. There are no indications of an early increase. Control is not recommended.

Cascadel Unit

The beetle infestations on this unit during the past 3 years have remained nearly static with subnormal loss in all species. These

losses have been less than 20 board feet per acre annually and are considered to be near the irreducible minimum for these stands. Control is not recommended, but since logging operations are in progress on the unit, there is a possibility of increased losses resulting from slash breeding of the western pine beetle. The situation should be watched for this contingency so that direct action can be taken in the event losses increase from this source.

Rock Creek Unit

A general decline in beetle losses of over 40 percent occurred since 1939. The near epidemic outbreak of the mountain pine beetle in sugar pine reported by Carlson on the Fish Creek drainage suddenly subsided from natural causes without extending into the 1940 season. The present low status of the infestation is expected to continue, therefore no control work is recommended. A limited amount of control work was carried out in this unit in the early spring of 1940. This work further augmented the natural decline already in progress.

Blue Canyon Unit

Here, as in other units located in the marginal stands, the infestation in 1940 registered a decided drop from the previous status. Since a further decline is expected to occur during the 1941 season, no control work is recommended.

Fence Meadow Unit

Infestations on this unit during 1939 showed a pronounced increase culminating in near epidemic status in the late fall period. Consequently control was recommended against the overwintering broods of beetles. The recommended work was carried out by the Sierra National Forest in the spring of 1940. A summary of this control project is given under the heading "Recent Control". The effectiveness of this control work is reflected in the greatly reduced losses immediately following. From an estimated annual loss of 600 trees containing a volume of 1,300,000 board feet in 1939 the loss for the 1940 following control was reduced to 175 trees with a volume of 350,000 board feet. The latter loss is considered normal for the unit and represents a very low endemic state. Since the present losses are minimum for these stands, no further control is recommended at this time.

RECENT CONTROL*

Maintenance control was carried out throughout the active beetle season of 1940 at Bass Lake. A total of 60 trees were treated locally; largely on the riparian areas of the lake. The peeling and burning method of control was employed and the work was efficiently done.

Direct control by the peeling and burning method was carried out at Fence Meadow during the period March 4 to 26, 1940. A total area of 16,000 acres was covered by this work, and a total of 186 trees containing a volume of 675 MBM were treated. Of this total, 97 trees with 487 MBM were sugar pine killed by the mountain pine beetle, and 89 trees with a volume of 188 MBM were ponderosa pine trees killed by the western pine beetle, Ips and flatheads.

Control by the same methods was carried out from April 1 to 6 on Dinkey Creek, and from April 10 to 24 on the Big Creek area. These two projects aggregated 960 acres in area. A total of 5 sugar pine trees with a volume of 28 MBM and a total of 54 ponderosa pine trees with 48 MBM were treated. These trees were killed by the mountain pine beetle and the western pine beetle respectively.

In addition to the above work, two other areas were given control treatment. At Fish Creek in the Rock Creek Unit, a total of 21 trees, both sugar pine and ponderosa pine, with a combined volume of 100 MBM were treated.

On the Batterson Ranch area of the Hugh Ryan unit, control work resulted in the treatment of 83 ponderosa pine trees containing a volume of 19 MBM. These were largely infested with the western pine beetle.

The beneficial results of the control work done on these projects is directly reflected in the sudden decrease in infestations on the units wherein the work was located.

SUMMARY

The outstanding characteristic of the 1940 infestation on the Sierra National Forest is the uniformly reduced losses over the entire forest. This reduction in terms of percentage of trees killed ranged from 80 to 60 percent less than the infestation of 1939.

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* Basic data included under this heading have been supplied by the Supervisor of the Sierra National Forest. Vide Associate Forester J. M. Buck. Memorandum dated October 24, 1940.

The infestation on all units is of a pronounced endemic character and without exhibiting any indications of an early change. The one exception is the local ridge-top outbreak north of Shaver Lake. Here the 1940 losses have increased due to local conditions, but are confined to a small area of poor site conditions.

The Dendroctonus beetles continue to be the principal tree killing forms. Flathead borers (Melanophila) are a close second on some local areas.

Top-killing by Ips and Phloeosinus is conspicuous locally in poor site stands.

Direct control is recommended only on areas where high recreational values are at stake. Control is warranted on such areas even though the infestations are endemic. It should be of the maintenance type directed toward protecting the stands from the least possible loss of high value trees.

During the year maintenance control was carried out in the recreational areas surrounding Bass Lake. Direct control was carried out in the Fence Meadow Unit to protect merchantable timber that was being threatened. This work was done by the Sierra National Forest under the direction of trained personnel.

TABLE I. COMPARATIVE SAMPLE PLOT LOSSES - 1938, 1939, 1940*

Sample Plot	Species	1938				1939				1940			
		No. Trees	Trees per A.	Volume B.M.	Volume per A.	No. Trees	Trees per A.	Volume B.M.	Volume per A.	No. Trees	Trees per A.	Volume B.M.	Volume per A.
Cascadel	Ponderosa pine	9	0.03	14,600	46	12	0.04	3,600	11	8	0.025	6,440	20
RS - 7	Sugar pine												
320 Acres	Total	9	0.03	14,600	46	12	0.04	3,600	11	8	0.025	6,440	20
	White fir												
	Incense cedar												
	Plot Total	9	0.03	14,600	46	12	0.04	3,600	11	8	0.025	6,440	20
Placer	Ponderosa pine	19	0.06	7,490	23	13	0.04	4,820	15	6	0.02	7,320	23
RS - 8	Jeffrey pine	8	0.03	11,160	34	18	0.06	11,210	38	6	0.02	8,640	27
320 Acres	Sugar pine					1	0.003	3,530	11	2	0.006	1,050	3
	Total	27	0.09	18,650	57	32	0.1	19,560	62	14	0.05	17,010	53
	White fir												
	Incense cedar												
	Plot Total	27	0.09	18,650	57	32	0.1	19,560	62	14	0.05	17,010	53
Jackass	Ponderosa pine	33	0.1	31,080	97	27	0.08	15,680	49	2	0.006	3,270	10
RS - 9	Jeffrey pine	1		1,690	5	1		800	3	2	0.006	3,110	10
320 Acres	Sugar pine	8	0.02	5,370	17	10	0.03	17,410	55	2	0.006	10,610	33
	Total	42	0.12	38,140	119	38	0.12	33,890	106	6	0.02	16,990	53
	White fir	4	0.01	10,940	34	3	0.01	10,060	31				
	Incense cedar	1		1,120	4	1		1,000	3				
	Plot Total	47	0.13	50,200	157	42	0.13	44,950	140	6	0.02	16,990	53

(continued next page)

* 1940 loss measured to October. Total yearly loss cannot be fully determined at this time.

TABLE I - (continued)

Fence Meadow	Ponderosa pine	33	0.1	81,170	253	22	0.07	52,630	165	3	0.01	21,130	69
RS - 11	Sugar pine	11	0.03	53,040	166	5	0.02	7,000	22				
320 Acres	Total	44	0.13	134,210	419	27	0.09	59,630	187	3	0.01	21,130	69
	White fir	2	0.01	3,190	10	4	0.01	10,000	31	1		4,640	14
	Incense cedar					2	0.006	700	2	1		160	.5
	Plot Total	46	0.14	137,400	429	33	0.101	70,330	220	5	0.01	25,930	83
Hugh Ryan	Ponderosa pine	12	0.04	17,070	53	9	0.03	7,120	22	2	0.006	2,380	7
SS - 1	Sugar pine												
320 Acres	Total	12	0.04	17,070	53	9	0.03	7,120	22	2	0.006	2,380	7
	White fir					2	0.006	1,200	4				
	Incense cedar	3	0.01	1,920	6	2	0.006	1,200	4				
	Plot Total	15	0.05	18,990	59	13	0.03	9,520	30	2	0.006	2,380	7

TABLE II. COMPARATIVE ROAD STRIP LOSSES, 1939-1940

Road Strip	Species	1939				1940			
		No. Trees	Trees per A.	Volume B.M.	Volume per A.	No. Trees	Trees per A.	Volume B.M.	Volume per A.
Chiquito	Ponderosa pine	9	0.02	26,150	46	11	0.02	17,850	32
Basin	Jeffrey pine	4	0.006	3,970	7	3	0.005	2,830	5
560 Acres	Sugar pine	1	0.002	1,120	2	4	0.006	7,400	14
	Strip Total	14	0.03	31,240	55	18	0.03	28,080	51

TABLE III. ESTIMATED UNIT PINE LOSSES - 1938, 1939, 1940

Unit	Area in Acres	1938		1939		1940	
		No. Trees	Volume B.M.	No. Trees	Volume B.M.	No. Trees	Volume B.M.
Hugh Ryan	16,700	104	124,800	125	110,000	40	32,000
Bass Lake	23,400	75	45,000	150	65,000	70	28,000
Jackass	12,600	320	576,000	1,000	1,020,000	240	190,000
Placer	28,700	550	467,000	1,120	496,000	280	112,000
Cascadel	11,500	24	16,800	250	75,000	110	33,000
Rock Creek	13,700	200	240,000	377	897,600	90	60,000
Blue Canyon	12,900	200	320,000	256	390,400	140	160,000
Fence Meadow	11,400	600	1,380,000	608	1,352,800	175	350,000
Totals	130,900	2,073	3,170,600	3,886	4,406,800	1,145	965,000

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FOREST INSECT LABORATORY-BERKELEY, CALIFORNIA

FOREST INSECT SURVEY
SIERRA NATIONAL FOREST
MT. DIABLO MERIDIAN

SCALE
In 0 ½ 1 2 3 4 Miles

N

LEGEND

SAMPLE PLOT — — — UNIT BOUNDARY

INSECT LOSS ESTIMATE
SEASON OF 1940

(SURVEY SEPT. 18-27, 1940)

HUGH RYAN: TREES 40, MBM 32, PP 25, SP S-, OTHER 18

BASS LAKE: TREES 65, MBM 22, PP 15, SP 6, OTHER 30, 14

PLACER: TREES 240, MBM 82, PP 40, SP RS-9, OTHER 25, 10

JACKASS: TREES 195, MBM 118, PP 45, SP 72, OTHER 40, 16

ROCK CREEK: TREES 75, MBM 48, PP 15, SP 12, OTHER 18, 9

CASCADE: TREES 100, MBM 43, PP 10, SP 10, OTHER 16, 4

BLUE CANYON: TREES 110, MBM 138, PP 30, SP 22, OTHER 25, 15

FENCE MEADOW: TREES 146, MBM 250, PP 35, SP 100, OTHER 40, 2

T.5S. T.6S. T.7S. T.8S. T.9S. T.10S. T.11S.

R.21E. R.22E. R.23E. R.24E. R.25E. R.26E.

20' 10' 37°00' 40' 30' 20' 119°10'